

AMENDMENT NO. 2 JULY 2018
TO
IS 1893 (PART 4) : 2015 CRITERIA FOR EARTHQUAKE RESISTANT
DESIGN OF STRUCTURES

PART 4 INDUSTRIAL STRUCTURES INCLUDING STACK-LIKE STRUCTURES

(First Revision)

(Second cover page, foreword, para 3) — Insert the following new para at the end:

‘Part 1 contains general provisions that are applicable to all types of structures, and provisions that are specific to buildings only. Unless stated otherwise, the provisions in Part 2 to Part 5 shall be read in conjunction with the general provisions (clauses 1 to 6) of IS 1893 (Part 1).’

(Page 4, clause 4.19) — Substitute the following for the existing:

‘4.19 Soft Storey — It is one in which the lateral stiffness is less than that in the storey above. The storey lateral stiffness is the total stiffness of all seismic force resisting elements resisting lateral earthquake shaking effects in the considered direction.’

[Page 4, clause 4.24] — Substitute the following for the existing:

‘4.24 Weak Storey — It is one in which the storey lateral strength [cumulative design shear strength of all structural members other than that of unreinforced masonry (URM) infills] is less than that in the storey above. The storey lateral strength is the total strength of all seismic force resisting elements sharing the lateral storey shear in the considered direction.’

(Page 6, clause 6.1.1, para 2, first sentence) — Substitute the following for the existing:

‘Earthquake generated vertical inertia forces are to be considered in design, wherever appropriate.’

[Page 7, clause 7.3.1, expression for A_h)] — Substitute the following for the existing:

$$A_h = \left(\frac{S_a}{g} \right)_{ss} \frac{I}{R}$$

where $\left(\frac{S_a}{g} \right)_{ss}$ is the site-specific spectral acceleration coefficient value denoting peak response acceleration corresponding to fundamental natural time period of structure.

Amendment No. 2 to IS 1893 (Part 4) : 2015

[Page 9, Table 2] — Substitute the following for the existing table:

Table 2 Earthquake Force Estimation, Method of Analysis and Design for Various Categories of Structures
(Clause 8.2.4)

Sl No.	Structure Category (see 8.1)	Earthquake Force Estimation			Method of		Minimum Lateral Force (Percent of Seismic Weight W) for Different Zones			
		Seismic Hazard Assessment Method	Damping	Method of Calculating Natural Period	Structural Analysis	Structural Design	II	III	IV	V
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	1	Site Specific / Standard Specific Seismic Hazard Assessment as per 7.	5 % for RC Structures and 2% for steel structures (see 9.4 and 15)	(see 9.3; 14.1 and 14.2) Modal analysis with all stiffnesses of the lateral as well as vertical load resisting members and masses of the building modeled (For preliminary time period estimation, see 9.3.2)	a) Linear for design, and b) Non-linear time history analysis for verification of mechanism	Limit state design as per IS 456 for RC; and Design as per IS 800 for steel	2.00	2.75	4.00	6.00
ii)	2	-do-	-do-	-do-	Linear for Design	-do-	1.50	2.00	3.00	4.50
iii)	3	-do-	-do-	-do-	-do-	-do-	1.25	1.75	2.50	3.75
iv)	4	-do-	-do-	-do-	-do-	-do-	1.00	1.50	2.00	3.00

(Page 12, clause 9.3, Note 2) — Substitute the following for the existing note:

‘2 There is no need to increase base shear, $\frac{\bar{V}_B}{V_B}$ for industrial structures.’

(Page 16, clause 14.2, Note 1, line 3) — Substitute ‘δ’ for ‘d’.

(Page 17, clause 16, para 3, expression of A_h) — Substitute the following for the existing:

$$\text{‘For site specific spectra : } A_h = \left(\frac{S_a}{g} \right)_{ss} \frac{I}{R} \text{’,}$$

(Page 17, clause 16, para 6) — Delete.

(Page 17, clause 16, para 7) — Delete.

(Page 18, clause 17.2, Title) — Substitute the following for the existing title:

‘17.2 Dynamic Analysis (Response Spectrum Method)’

(Page 18, clause 17.2, fourth sentence) – Substitute the following for the existing:

‘Detailed dynamic analysis shall be required where analysis is based on site-specific response spectrum.’

(Page 20, Annex A, Table 15, title) — Substitute ‘Spectral Acceleration Coefficient S_a/g ’ for ‘Zone Factor Z ’.

(Page 20, Annex A, Table 15) — Insert the following note at the end:

‘NOTE — At time $t = 0$, the multiplying factor need not be applied, and the value is specified only for suitable interpolation between time $t = 0$ and $t = 0.1$

(Page 21, Annex B, figure) — Substitute ‘To be used for fundamental mode (for fundamental natural period)’ for ‘To be used for the first mode’.